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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/362,055	07/28/1999	DHARAM PAL GOSAIN	P99.1160	6360
26263	7590	11/04/2003	EXAMINER	
SONNENSCHN NATH & ROSENTHAL LLP			SCHILLINGER, LAURA M	
P.O. BOX 061080			ART UNIT	
WACKER DRIVE STATION, SEARS TOWER			PAPER NUMBER	
CHICAGO, IL 60606-1080			2813	

DATE MAILED: 11/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/362,055

Applicant(s)

GOSAIN ET AL.

Examiner

Laura M Schillinger

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 September 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3 and 5-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to Amendment C, dated 9/14/01 in Paper No. 16.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371⁹ of this title before the invention thereof by the applicant for patent.

2. Claims 1-3 and 6-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Zhang et al ('585).

In reference to amended claim 1, Zhang et al teaches a method comprising:

depositing a semiconductor film on a substrate (Col.4, lines: 28-32);

forming a hydrogen-containing film on the semiconductor film (Col.6, lines: 1-25);

calculating pulse energy beam for an energy density, a number of pulses, and a pulse width of a pulse energy beam so that the beam does not melt the semiconductor film (this claim limitation is inherent, warping layers/substrates through annealing processes is a well-known semiconductor processing problem, thus annealing steps performed by lasers are distributed in carefully calculated doses to ensure that the substrate and its corresponding layers do not become warped- Zhang teaches laser

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irradiation and it is inherent that Zhang's laser processing would be calculated so as not to melt and warp the substrates layers, because this would render an inoperable device; See also Col.6, lines: 55-65 and Col.4, lines: 35-40);

irradiating said pulse energy beam using calculated values to heat the hydrogen-containing film to diffuse hydrogen in the semiconductor film (Col.6, lines: 57-65).

In reference to claim 2, Zhang et al teaches wherein the pulse energy beam does not melt the semiconductor film (Col.4, lines: 15-20).

In reference to claim 3, Zhang et al teaches wherein the pulse energy beam is a laser, electron, or ion beam (Col.6, line: 59).

In reference to claim 6, Zhang et al teaches wherein the semiconductor film is polycrystalline, amorphous, or single crystal silicon film (Col.4, lines: 28-33).

In reference to claim 7, Zhang et al teaches wherein the hydrogen containing film is silicon nitride or amorphous silicon, or a combination (Col.6-7, lines: 65-3).

In reference to claim 8, Zhang et al teaches including an absorption layer (Col.4, lines: 55-60).

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In reference to claim 9, Zhang et al teaches wherein the absorption layer is selected from the group consisting of molybdenum, tantalum, and tungsten (Col.4, lines: 55-60) .

In reference to claim 10, Zhang et al teaches wherein the absorption film is silicon (Col.6, lines: 5-8).

In reference to claim 11, Zhang et al teaches wherein the device is a TFT (Col.1, lines: 15-20).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang ('585) as applied to claim 1 above, and further in view of JP 08228010A. Zhang teaches the above steps yet fails to teach wherein the pulse energy density is less to diffuse hydrogen than to recrystallize the amorphous silicon layer. However, Japanese Patent 08228010A teaches a method with two separate laser annealing steps, one to diffuse hydrogen/crystallize the semiconductor layer and another to recrystallize the semiconductor layer. 08228010 teaches that the laser energy density of a first

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crystallization/diffusion step is 300 mJ/cm(2) (Col.3, lines:40-50) and the energy density of the recrystallization should be between 300-400mJ/cm (2). Therefore, it would have been obvious to one of ordinary skill in the art to teach the method of Zhang by implementing the two-part laser annealing process of 08228010, since it helps streamline the manufacturing process.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al ('585) as applied to claim 1 above, and further in view of Inou ('461). In reference to claim 5, Zhang teaches wherein the substrate is plastic (Col.1, lines: 15-20).

However Zhang fails to explicitly teach that the plastic substrate is selected from the group comprising: polyether sulfone, polyethylene terephthalate, polymethyl methacrylate, and polycarbonate.

However, Inou teaches that plastic substrates may be selected from the group comprising: polyether sulfone, polyethylene terephthalate, polymethyl methacrylate, and polycarbonate (Col.7, lines: 25-30).

Therefore it would have been obvious to one of ordinary skill in the art to combine the plastic substrate taught by Zhang with the materials taught by Inou, because the materials taught by Inou are heat resistant and would prevent substrate warpage.

Response to Arguments

Applicant's arguments filed 9/14/01 have been fully considered but they are not persuasive. Applicant argues that "depositing" is not anticipated by the ion implantation step taught by Zhang, and the depositing should be made by PECVD. However, ion implantation is considered a method of depositing and therefore Applicant's argument is not considered persuasive.

Applicant argues that the thermal processing taught by Zhang does not anticipate the lower energy as claimed. However it is understood that the energy required to heat the substrate to a lower temperature (200°) is less than that required to heat the substrate to a higher temperature in order to crystallize (350-400°). Therefore, Applicant's argument is not persuasive.

Applicant's argue that Zhang's heat treatment cannot anticipate Applicant's pulsed energy- however Zhang teaches the heating may be performed by a laser which is pulsed energy and therefore such an argument is not persuasive.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M Schillinger whose telephone number is (703) 308-6425. The examiner can normally be reached on M-T, R-F 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W Whitehead, Jr. can be reached on (703) 308-4940. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

LMS

October 27, 2003


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800